

Atty. Docket No. ESST-00301

Remarks

Reconsideration of the application is respectfully requested.

Claims 1-5, 7-13 and 15-23 are pending. Claims 1, 7, 10, 18 and 19 have been amended. Claims 5, 8, 13 and 15-17 have been cancelled in this response and amendment. Claims 6 and 14 were cancelled in a previous action.

Claims 1, 4, 5, 7, 9-13, 15-18, 21 and 23 stand rejected under 35 USC 103(a) over Sridhar in view of Manning. Also, Claims 2, 3, 8, 19, 20 and 22 stand rejected under 35 USC 103(a) over Sridhar in view of Yeh. Applicant responds with the amended claims, which includes the cancellation of claims, and with the discussion set forth below.

Claims 1, 5, 13 and 18 stand rejected under the judicially created doctrine of Double Patenting. In response, Applicant has submitted a terminal disclaimer.

This amendment is intended as a diligent effort to forward the prosecution of this application, and to clarify the invention as defined in the claims and their equivalents.

The Invention

The invention is directed to an interface for transferring data from a real-time data transfer system to a signal processing unit. In one embodiment, the invention includes a circular buffer having an input configured to receive data samples from the real-time data transfer system and to periodically send data samples received from the real-time data transfer system to the signal processing unit when the signal processing unit accepts a transfer, wherein the data is stored and transferred according to a first-in, first-out operational protocol. The embodiment further includes a first counter circuit communicating with the signal processing unit and the data transfer system and configured to increment for each data sample sent to the circular buffer from the data transfer system and decrement for each data sample sent to the signal processing unit from the circular buffer, where the counter circuit is configured to count beyond the physical range of the buffer to account for data samples

Atty. Docket No. ESST-00301

transferred through the circular buffer. As covered in the amended claims, the invention further includes a second circular buffer having an input and an output configured to receive data samples from the signal processing unit and to send data samples to the real-time data transfer system when the data is available. Also covered in the amended claims, the claimed embodiment further includes a second counter circuit communicating with the second circular buffer and configured to increment each time a data sample is received by the second circular buffer from the signal processing unit and decrement each time a data sample is sent from the second circular buffer to the data transfer system, where the counter is configured to count beyond the physical range of the buffer. A switch is also included for communicating with the second counter circuit and the data transfer system. As discussed below, neither of the cited references discloses the claimed invention in the claims as currently amended.

Rejections of the Claims, Analysis of the References and the Claims

Claims 1, 4, 5, 7, 9-13, 15-18, 21 and 23 stand rejected under 35 USC 103(a) over Sridhar in view of Manning. Also, Claims 2, 3, 8, 19, 20 and 22 stand rejected under 35 USC 103(a) over Sridhar in view of Yeh.

Sridhar et. al. patent (5,802,153)

Although Sridhar teaches monitoring for buffer over/under-run conditions, he does not teach the use of the over-range counter in our invention. As stated by the examiner, Sridhar does not mention incrementing and decrementing the counter for each sample. Not mentioned by the examiner, but according to the claimed invention, is the fact that whatever counters are implicit in Sridhar's invention are not taught to have a range beyond the size of the buffer. This language is reflected in the claims as amended. This feature of the claimed invention allows the host signal processor to work seamlessly in the case of over/under-run conditions. In Sridhar's invention, these conditions cause the device to "reset the memory and to institute retraining procedures for the communications system." (Column 16, lines 17-20.) In the claimed invention, these conditions are not handled directly by the host signal processor. The host signal processor will continue to process the signal as normal. The receive buffer over-run condition will cause the host signal processor to see noise in the receive signal, which may or may not indirectly cause a retrain. This is similar to the effect

Atty. Docket No. ESST-00301

of other noise sources, particularly "impulse" noise. The transmit buffer under-run condition will result in a noisy signal on the line, which may or may not cause the remote modem to initiate a retrain. Again, this is similar to the behavior for other noise sources, particularly "impulse" noise.

Manning et. al. patent (5,781,533)

Manning's invention generally applies to the link layer of a communication system, whereas the claimed invention generally applies to the physical layer. In the link layer, it is possible to use flow control to guarantee that no data over-run conditions occur. Basically, the transmitter is prevented from transmitting (or caused to re-transmit) data that cannot be received by the receiver. One requirement of Manning's invention is a guarantee of "no cell loss." (Column 2, lines 5-10.) In contrast, the claimed invention is only useful if data loss is allowed. For example, in a host-signal processing system, a real-time CODEC must communicate with a non-real-time host processor. The CODEC has a constant flow of transmit and receive samples, as described in our patent (6,327,249, Column 1, lines 60-62) and requires a very deterministic sampling rate, as described by Sridhar (Column 3, line 26.) The CODEC must convert one transmit and one receive sample every sampling period, regardless of whether the host processor has time to process the samples. Therefore, flow control is not possible and there is a chance of lost data. In that case, some mechanism is required for handling buffer over/under-run. The claimed invention handles this issue with the over-range counter.

Although Manning teaches the use of various counters, they are all used specifically for flow control purposes, to prevent loss of data. For example, if the counters indicate that no buffers are available for receipt of data, the transmit element ceases data cell transmission (Column 8, lines 5-11.) This kind of operation is not possible in the host signal processing scenario, because the CODEC cannot cease transmission. As described above, it requires a constant flow of transmit and receive samples at a very deterministic sampling rate. The purpose of our counter is to keep track of all the samples converted by the CODEC, even under over/under-run conditions. It is not obvious that any of Manning's counters are analogous to our counter. In terms of the claims, none of Manning's counters are configured to increment based on data transfer from a "real-time data transfer system." In this context, a

Atty. Docket No. ESST-00301

"real-time data transfer system" is one where data must be transferred at fixed interval, as in a CODEC. Manning's counters are all connected to non-real-time data transfer systems, where the data transfer interval is variable depending on the buffer status. All of the claims have been amended to include this limitation of a "real-time" data transfer system. This distinguishes the relevance of Manning in light of the invention as claimed in the above amended claims.

Yeh Patent No. 5,721,830 As the examiner points out directly, Yeh does not disclose a counter with programmable threshold capability. The claims are directed to such capability, and are all limited as such. Moreover, as discussed above, the claimed invention is for operations that require constant communication of data, particularly real-time communication, and this is not addressed by either Manning or Sridhar. Thus, the combination of these two references with Yeh is no more relevant in this context. There is no explicit disclosure of this feature in Yeh, and there is not any motivation disclosed in Yeh to combine such a feature.

Conclusion of the claim Analysis

Therefore, it is respectfully submitted that the amended claims are distinguishable from these references, and that the claims as amended are patentable over these references, either considered individually or in combination. Therefore, Claims 1, 4, 5, 7, 9-13, 15-18, 21 and 23 are patentable under 35 USC 103(a) over Sridhar in view of Manning. Also, Claims 2, 3, 8, 19, 20 and 22 are patentable under 35 USC 103(a) over Sridhar in view of Yeh.

Conclusion:

Based on the arguments above, the claims as amended herein, along with equivalents, are patentable in light of the prior art. Applicant respectfully requests an examination of the claim limitations, and include consideration of equivalents allowance of these claims. If the examiner agrees with these arguments, then Applicant accordingly requests allowance of the claims.

Atty. Docket No. ESST-00301


If the Examiner finds that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

A two month extension of time is hereby requested, along with any further extension that may be required.

The Commissioner is authorized to charge the fee for extensions if needed and any additional fees due or credit any overpayment to Deposit Account No. 50-2421.

Sincerely,

Dated: 08/15/2005


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